

What is claimed is:

1. A pulley thrust control device for a belt-type continuously variable transmission unit comprising a driving pulley and a following pulley connected via a belt with the driving pulley, and capable of continuously changing a speed changing ratio by changing effective diameters of the driving pulley and the following pulley,

wherein a thrust ratio between the thrust of the driving pulley and the thrust of the following pulley is determined, and

thrust of at least one of the driving pulley and the following pulley is controlled based on a state of change of the thrust ratio.

2. The device according to claim 1, wherein the pulley thrust is controlled such that the thrust ratio approaches a point at which the gradient of change of the thrust ratio changes.

3. The device according to claim 2, wherein the gradient of the thrust ratio is periodically determined while the pulley thrust changes; compensation for a time delay is applied to determined values for the gradient; and a point at which the gradient changes is determined based on a signal for which the time delay has been compensated.

4. The device according to claim 3, wherein, during the compensation for a time delay, a time for delay compensation

is set according to the gradient at that time.

5. The device according to claim 3, wherein a process of compensating for the time delay is a process using a high-pass filter to cut a low frequency signal associated with a periodically-determined gradient.

6. The device according to claim 1, wherein the state of change of the thrust ratio is determined while the pulley thrust is varied according to a predetermined cycle.

7. The device according to claim 1, wherein the thrust ratio is determined by measuring a hydraulic pressure which controls thrust of the driving pulley and the following pulley.

8. The device according to claim 1, wherein the thrust ratio is determined based on a command value for a hydraulic pressure which controls thrust of the driving pulley and the following pulley.

9. The device according to claim 1, further comprising a control map for determining pulley thrust based on a state of power transmission of the continuously variable transmission unit, wherein the control map is amended based on the state of change of the thrust ratio.

10. The device according to claim 1, wherein an average friction coefficient ratio is used in place of the thrust ratio

so that the pulley thrust is controlled based on the state of change of the average friction coefficient ratio, the average friction coefficient ratio being obtained by multiplying the thrust ratio by a ratio between belt hanging diameters of the driving pulley and the following pulley.

11. A pulley thrust control device for a belt type continuous variable transmission unit, comprising a driving pulley and a following pulley connected via a belt with the driving pulley, and capable of continuously changing a speed changing ratio by changing effective diameters of the driving pulley and the following pulley,

wherein friction characteristics between the belt and the pulley is calculated based on a state of change of a thrust ratio while decreasing thrust of either one of the driving pulley and the following pulley under conditions of substantially constant input torque and a substantially constant speed changing ratio, and

the thrust of either one of the driving pulley and the following pulley is determined based on the friction characteristics calculated.

12. The device according to claim 11, wherein, while decreasing the thrust of either one of the driving pulley and the following pulley, friction characteristics between the belt and the pulley is calculated based on the thrust ratio change from decreasing to increasing.

13. A method for creating a control map for a belt type continuous variable transmission unit comprising a driving pulley and a following pulley connected via a belt with the driving pulley, and capable of continuously changing a speed changing ratio by changing effective diameters of the driving pulley and the following pulley, comprising the steps of

calculating friction characteristics between the belt and the pulley based on a state of change of a thrust ratio while decreasing thrust of either one of the driving pulley and the following pulley under conditions of substantially constant input torque and a substantially constant speed changing ratio, determining the thrust of either one of the driving pulley and the following pulley based on the friction characteristics calculated, and

creating a control map for pulley thrust control based on the thrust determined.

14. The method according to claim 13, wherein, while decreasing the thrust of either one of the driving pulley and the following pulley, friction characteristics between the belt and the pulley is calculated based on the thrust ratio change from decreasing to increasing.

15. A pulley thrust control device for a belt type continuous variable transmission unit, comprising a driving pulley and a following pulley connected via a belt with the driving pulley, and capable of continuously changing a speed changing ratio by changing effective diameters of the driving pulley and the

following pulley,

wherein a change in friction characteristics between the belt and the pulley is detected based on a state of change of a thrust ratio while decreasing thrust of either one of the driving pulley and the following pulley under conditions of substantially constant input torque and a substantially constant speed changing ratio.

10 16. A pulley thrust control device for a belt type continuous variable transmission unit, comprising a driving pulley and a following pulley connected via a belt with the driving pulley, and capable of continuously changing a speed changing ratio by changing effective diameters of the driving pulley and the following pulley,

15 wherein change of friction characteristics between the belt and the pulley is determined based on a magnitude of a thrust ratio while decreasing thrust of either one of the driving pulley and the following pulley under conditions of substantially constant input torque and a substantially constant speed changing ratio.

25 17. A pulley thrust control device for a belt type continuous variable transmission unit, comprising a driving pulley and a following pulley connected via a belt with the driving pulley, and capable of continuously changing a speed changing ratio by changing effective diameters of the driving pulley and the following pulley,

wherein whether or not a thrust ratio has peaked is

determined while decreasing thrust of either one of the driving pulley and the following pulley under conditions of substantially constant input torque and a substantially constant speed changing ratio, and when no peak is detected, it is determined that friction  
5 characteristics between the belt and the pulley has deteriorated.

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